C-6.15 Analyze the composition of a chemical sample by using gas chromatography.

Revised Taxonomy Level 4 Analyze conceptual knowledge

Students did not study this concept in physical science

It is essential for students to

- Understand that chromatography is the process of separating small amounts of substances from a mixture by the rates at which they move through or along a medium (the stationary phase). The components move at different rates because they vary in solubility and their attraction to the medium.
- There are several types of chromatography
  - Paper chromatography
    - The mixture is dissolved in a solvent and the medium through which the mixture moves is a piece of blotter paper.
  - Column chromatography
    - The mixture is placed in a column containing a material which attracts the molecules of the mixture.
  - Gas chromatography
    - The mixture is vaporized and passed along a heated column in a stream of gas.
- Describe what types of mixtures are best suited for separation by gas chromatography and give examples.
- Describe the importance of each step in the separation processes to the overall process.
- Understand how differentiation in the properties of the components of the mixture allow for separation by gas chromatography

Assessment

The revised taxonomy verb for this indicator is analyze which means to "break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose". In this case, students will use the process of gas chromatography to separate a mixture into component parts. Because the indicator is written as conceptual knowledge, assessments should require that students understand the "interrelationships among the basic elements within a larger structure that enable them to The verb implement (use) means that an additional focus of assessment will be for students to show that they can "apply a procedure to an unfamiliar task". The knowledge dimension of the indicator, procedural knowledge means "knowledge of subject-specific techniques and methods" In this case the gas chromatography procedure for separating a mixture. A key part of the assessment will be for students to show that they can apply the knowledge to a new situation, not just repeat the exact procedures which they have studied. This requires that students have a conceptual understanding of mixtures and separation by chromatography.